SELF-DIAGNOSTIC FUNCTION

# SERVICE MANUAL

# BA-4 CHASSIS

| MODEL | COMMANDER | DEST. | CHASSIS NO. |
|---|---|---|---|
| KV-27S40 | RM-Y165 | US | SCC-S01H-A |
| KV-27S40 | RM-Y165 | CND | SCC-S03E-A |
| KV-27S45 | RM-Y167 | US | SCC-S01J-A |
| KV-27S45 | RM-Y167 | CND | SCC-S03F-A |
| KV-27S65 | RM-Y167 | US | SCC-S01K-A |
| KV-27S65 | RM-Y167 | CND | SCC-S03G-A |
| KV-29SL40 | RM-Y165 | E | SCC-S04X-A |
| KV-29SL40A | RM-Y165 | E | SCC-S04S-A |
| KV-29SL40C | RM-Y165 | E | SCC-S04U-A |
| KV-29SL45 | RM-Y167 | E | SCC-S04Y-A |
| KV-29SL65 | RM-Y167 | E | SCC-S06F-A |
| KV-29SL65C | RM-Y167 | E | SCC-S04V-A |
| KV-29XL40M | RM-Y165 | MX | SCC-S02D-A |
| KV-29XL40P | RM-Y165 | E | SCC-S04R-A |
| KV-29XT11A | RM-Y165 | E | SCC-S04T-A |

KV-27S45

RM-Y167

MICROFILM

TRINITRON® COLOR TV

SONY®

# WARNINGS AND CAUTIONS

**CAUTION!**

SHORT CIRCUIT THE ANODE OF THE PICTURE TUBE AND THE ANODE CAP TO THE METAL CHASSIS, CRT SHIELD, OR CARBON PAINTED ON THE CRT, AFTER REMOVING THE ANODE.

**WARNING!!**

AN ISOLATION TRANSFORMER SHOULD BE USED DURING ANY SERVICE TO AVOID POSSIBLE SHOCK HAZARD, BECAUSE OF LIVE CHASSIS.THE CHASSIS OF THIS RECEIVER IS DIRECTLY CONNECTED TO THE AC POWER LINE.

**SAFETY-RELATED COMPONENT WARNING!!**

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL FOR SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL FOR SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

**ATTENTION**

APRES AVOIR DECONNECTE LE CAP DE L'ANODE, COURT-CIRCUITER L'ANODE DU TUBE CATHODIQUE ET CELUI DE L'ANODE DU CAP AU CHASSIS METALLIQUE DE L'APPAREIL, OU AU COUCHE DE CARBONE PEINTE SUR LE TUBE CATHODIQUE OU AU BLINDAGE DU TUBE CATHODIQUE.

**ATTENTION!!**

AFIN D'EVITER TOUT RESQUE D'ELECTROCUTION PROVENANT D'UN CHÁSSIS SOUS TENSION, UN TRANSFORMATEUR D'ISOLEMENT DOIT ETRE UTILISÉ LORS DE TOUT DÉPANNAGE. LE CHÁSSIS DE CE RÉCEPTEUR EST DIRECTEMENT RACCORDÉ À L'ALIMENTATION SECTEUR.

**ATTENTION AUX COMPOSANTS RELATIFS A LA SECURITE!!**

LES COMPOSANTS IDENTIFIES PAR UNE TRAME ET PAR UNE MARQUE ⚠ SUR LES SCHEMAS DE PRINCIPE, LES VUES EXPLOSEES ET LES LISTES DE PIECES SONT D'UNEIMPORTANCE CRITIQUE POUR LA SECURITE DU FONCTIONNEMENT. NE LES REMPLACER QUE PAR DES COMPOSANTS SONY DONT LE NUMERO DE PIECE EST INDIQUE DANS LE PRESENT MANUEL OU DANS DES SUPPLEMENTS PUBLIES PAR SONY. LES REGLAGES DE CIRCUIT DONT L'IMPORTANCE EST CRITIQUE POUR LA SECURITE DU FONCTIONNEMENT SONT IDENTIFIES DANS LE PRESENT MANUEL. SUIVRE CES PROCEDURES LORS DE CHAQUE REMPLACEMENT DE COMPOSANTS CRITIQUES, OU LORSQU'UN MAUVAIS FONTIONNEMENT SUSPECTE.

# SELF-DIAGNOSTIC FUNCTION

The units in this manual contain a self-diagnostic function. If an error occurs, the STANDBY/TIMER lamp will automatically begin to flash. The number of times the lamp flashes translates to a probable source of the problem. A definition of the STANDBY/TIMER lamp flash indicators is listed in the instruction manual for the user's knowledge and reference. If an error symptom cannot be reproduced, the remote commander can be used to review the failure occurrence data stored in memory to reveal past problems and how often these problems occur.

## 1. DIAGNOSTIC TEST INDICATORS

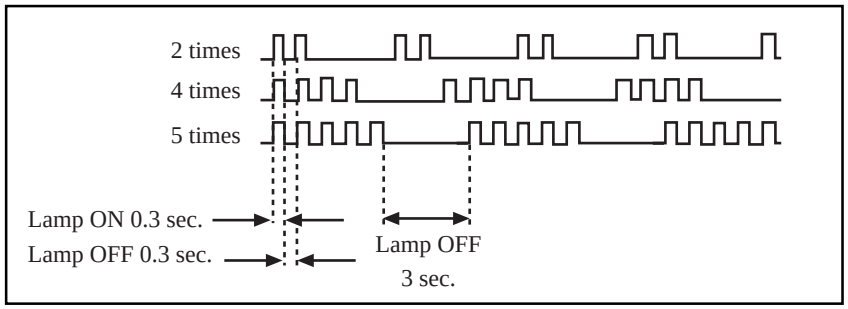
When an error occurs, the STANDBY/TIMER lamp will flash a set number of times to indicate the possible cause of the problem. If there is more than one error, the lamp will identify the first of the problem areas.

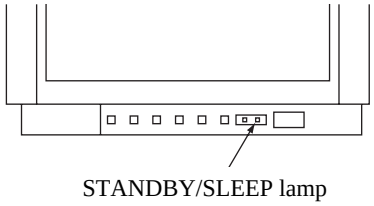
Results for all of the following diagnostic items are displayed on screen. No error has occured if the the screen displays a "0" .

| Diagnostic Item Description | No. of times STANDBY/TIMER lamp flashes | Self-diagnostic display/ Diagnostic result | Probable Cause Location | Detected Symptoms |
|---|---|---|---|---|
| * Power does not turn on | Does not light | ——— | * Power cord is not plugged in.<br>* Fuse is burned out (F5050) (E Board) | * Power does not come on.<br>* No power is suppled to the TV.<br>* AC power supply is faulty. |
| * +B overcurrent (OCP) | 2 times | 2:0 or 2:1 | * H.OUT (Q502) is shorted. (A board)<br>* IC1751 and Q1751 is shorted. (C board) | * Power does not come on.<br>* Load on power line is shorted. |
| * Vertical deflection stopped | 4 times | 4:0 or 4:1 | * +13V is not supplied. (A board)<br>* IC 541 is faulty (A board) | * Has entered standby state after horizontal raster.<br>* Vertical deflection pulse is stopped.<br>* Power line is shorted or power supply is stopped. |
| * White balance failure (not balanced) | 5 times | 5:0 or 5:1 | * Video OUT (Q306 to 308) is faulty. (A board)<br>* IC301 is faulty. (A board)<br>* G2 is improperly adjusted. (Note 2) | * No raster is generated.<br>* CRT cathode current detection reference pulse output is small. |

Note 1: If a +B overcurrent is detected, stoppage of the vertical deflection is detected simultaneously.
The symptom that is diagnosed first by the microcontroller is displayed on the screen.
Note 2: Refer to Screen (G2) Adjustment in Section 3-4 of this manual.

## 2. DISPLAY OF STANDBY/TIMER LIGHT FLASH COUNT




| Diagnostic Item | Flash Count* |
|---|---|
| +B overcurrent | 2 times |
| Vertical deflection stopped | 4 times |
| White balance failure | 5 times |

* One flash count is not used for self-diagnostic.

## 3. STOPPING THE STANDBY/TIMER FLASH

Turn off the power switch on the TV main unit or unplug the power cord from the outlet to stop the STANDBY/TIMER lamp from flashing.

## 4. SELF-DIAGNOSTIC SCREEN DISPLAY

For errors with symptoms such as "power sometimes shuts off" or "screen sometimes goes out" that cannot be confirmed, it is possible to bring up past occurances of failure for confirmation on the screen:

**[To Bring Up Screen Test]**

In standby mode, press buttons on the remote commander sequentially in rapid succession as shown below:

Screen display ➡ channel 5 ➡ Sound volume − ➡ Power ON

⇧

Note that this differs from entering the service mode (sound volume + ).

**Self-Diagnostic screen display**

```
SELF DIAGNOSTIC

2:          0  <----------Numeral "0" means that no fault has been detected.
3:    N/A   0
4:          0
5:          1  <----------Numeral "1" means a fault has been detected one time only.
101:  N/A   0
```

## 5. HANDLING OF SELF-DIAGNOSTIC SCREEN DISPLAY

Since the diagnostic results displayed on the screen are not automatically cleared, always check the self-diagnostic screen during repairs. When you have completed the repairs, clear the result display to "0".

Unless the result display is cleared to "0", the self-diagnostic function will not be able to detect subsequent faults after completion of the repairs.

**[Clearing the result display]**

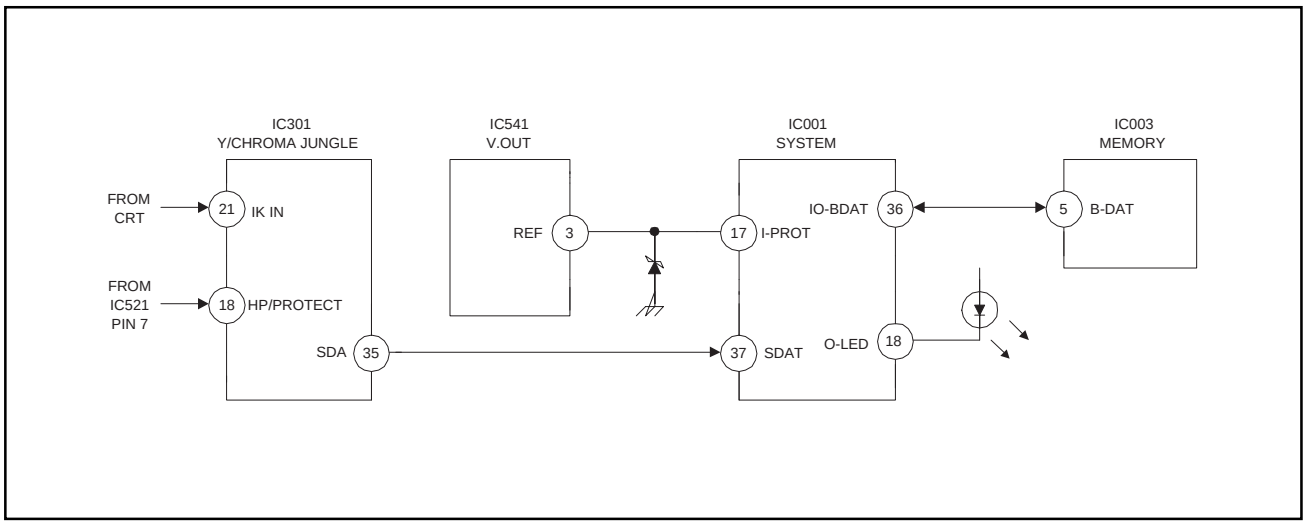
To clear the result display to "0", press buttons on the remote commander sequentially as shown below when the diagnostic screen is being displayed.

Channel 8 ➡ ENTER

**[Quitting Self-diagnostic screen]**

To quit the entire self-diagnostic screen, turn off the power switch on the remote commander or the main unit.

## 6. SELF-DIAGNOSTIC CIRCUIT




| | |
|---|---|
| +B overcurrent (OCP) | Occurs when an overcurrent on the +B(115V) line is detected by pin 18 of IC301. If the voltage to pin 18 of IC301 is less than 1V when V.SYNC is more than seven verticals in a period, the unit will automatically turn off. |
| Vertical deflection stopped | Occurs when an absence of the vertical deflection pulse is detected by pin 17 of IC001. Power supply will shut down when waveform interval exceeds 2 seconds. |
| White balance failure | If the RGB levels* do not balance within 2 seconds after the power is turned on, this error will be detected by IC301. TV will stay on, but there will be no picture. |

*(Refers to the RGB levels of the AKB detection Ref pulse that detects IK.)

# SECTION 3
# SET-UP ADJUSTMENTS

The following adjustments should be made when a complete realignment is required or a new picture tube is installed. These adjustments should be performed with rated power supply voltage unless otherwise noted.

The controls and switch should be set as follows unless otherwise noted:

PICTURE control ..... normal

BRIGHTNESS control ..... normal

Perform the adjustments in order as follows:

1. Beam Landing
2. Convergence
3. Focus
4. Screen (G2) and White Balance

**Note:** Test Equipment Required

1. Color Bar Pattern Generator
2. Degausser
3. DC Power Supply
4. Digital Multimeter

## 3-1. BEAM LANDING

**Preparation:**

- Feed in the white pattern signal.
- Before starting, degauss the entire screen.

1. Input a raster signal with the pattern generator.
2. Loosen the deflection yoke mounting screw, and set the purity control to the center as shown in Fig.2.
3. Turn the raster signal of the pattern generator to green.
4. Move the deflection yoke backward, and adjust with the purity control so that green is in the center and red and blue are at the sides evenly. (Fig.3)
5. Move the deflection yoke forward, and adjust so that the entire screen becomes green. (Fig.1)
6. Switch over the raster signal to red and blue and confirm the condition.
7. When the position of the deflection yoke is determined, tighten it with the deflection yoke mounting screw.
8. When landing at the corner is not right, adjust by using the disk magnets. (Fig.4)

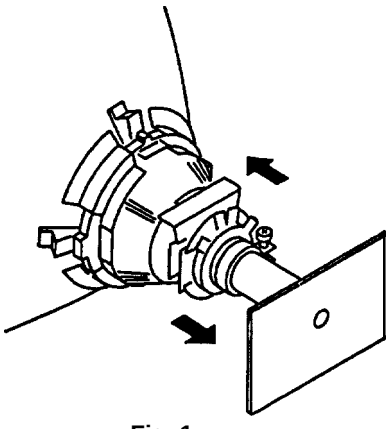


Fig. 1

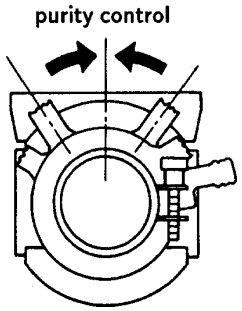



Fig. 2

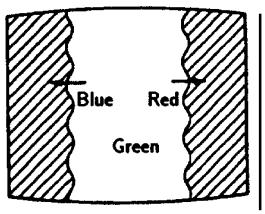



Fig. 3

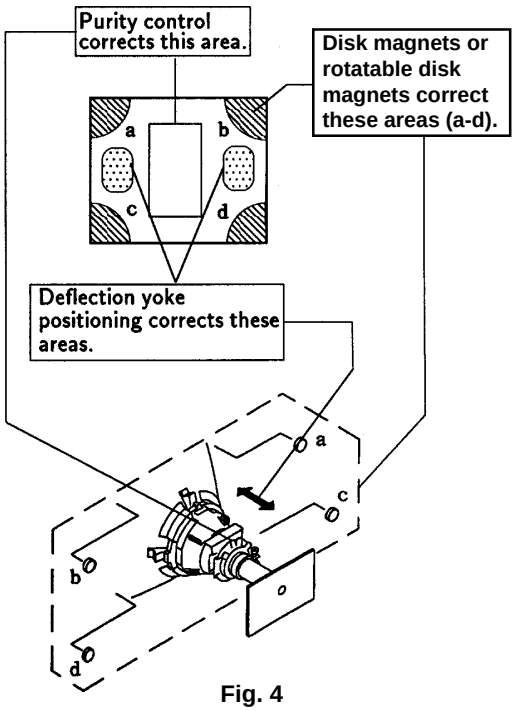



Fig. 4

## 3-2. CONVERGENCE

**Preparation:**

- Before starting, perform FOCUS, V. LIN and V. SIZE adjustments.
- Set BRIGHTNESS control to minimum.
- Feed in dot pattern.

### (1) Vertical Static Convergence

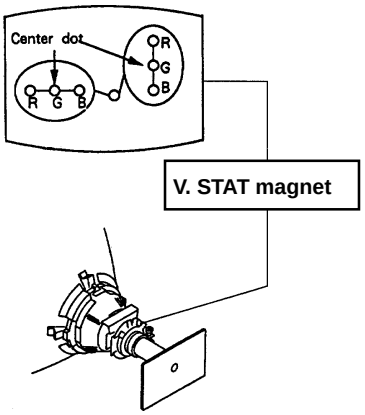
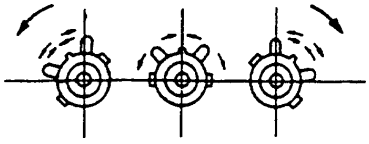


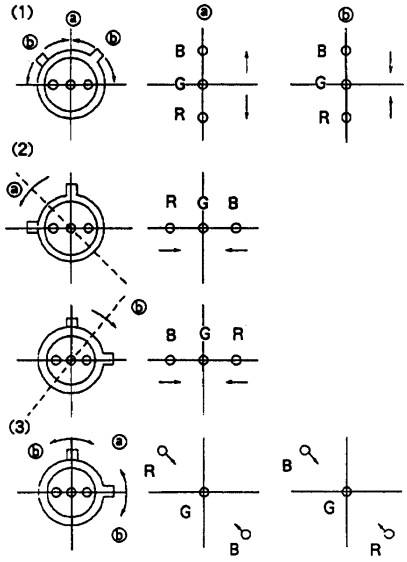

Fig. 5

1. Adjust V. STAT magnet to converge red, green and blue dots in the center of the screen. (Vertical movement)

   Tilt the V. STAT magnet and adjust static convergence to open or close the V. STAT magnet.



2. When the V. STAT magnet is moved in the direction of arrow ⓐ and ⓑ, red, green, and blue dots move as shown below:




If the blue dot does not converge with red and green dots, perform the following steps:

- Move BMC magnet (a) to correct insufficient H. Static convergence.
- Rotate BMC magnet (b) to correct insufficient V. Static convergence.

In either case, repeat Beam Landing Adjustment.

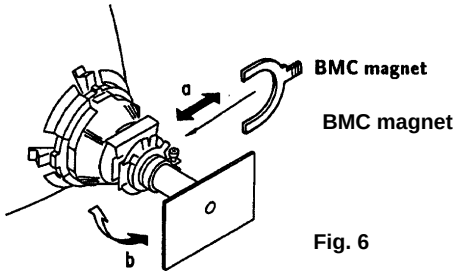



Fig. 6

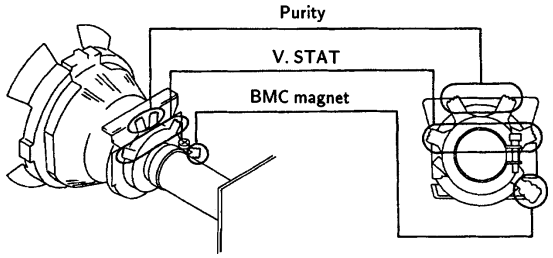



Fig. 7

### ( 2 ) Dynamic Convergence Adjustment

**Preparation:**

- Before starting, perform Horizontal and Vertical Static Convergence Adjustment.

1. Slightly loosen deflection yoke screw.
2. Remove deflection yoke spacers.
3. Move the deflection yoke for best convergence as shown below. ( Fig. 8)
4. Tighten the deflection yoke screw.
5. Install the deflection yoke spacers.

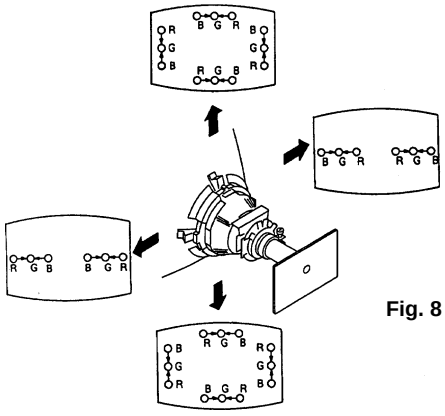


Fig. 8

### (3) Screen-corner Convergence

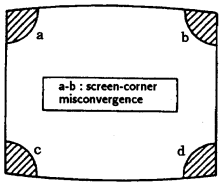
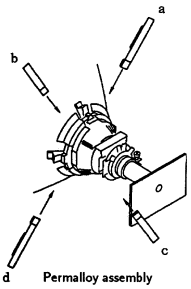



Fig. 9

Affix a permalloy assembly corresponding to the misconverged areas:




## 3-3. FOCUS

1. Adjust FOCUS control for best picture.

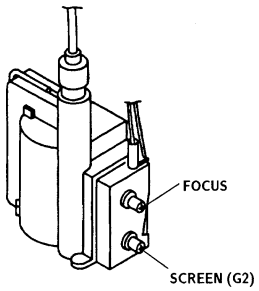
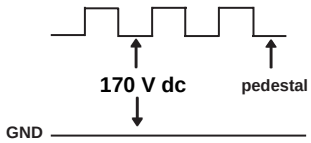



Fig. 10

## 3-4. SCREEN (G2)

1. Input a dots pattern.
2. Set the PICTURE and BRIGHT controls at minimum and COLOR control at normal.
3. Adjust SBRT, GCUT, BCUT in service mode with an oscilloscope as shown in Fig. 11 so that voltages on the red, green, and blue cathodes are 170Vdc.

Fig. 11



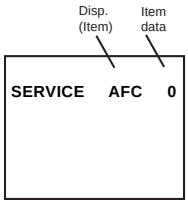

4. Observe the screen and adjust SCREEN (G2) VR to obtain the faintly visible background of dot signal.

## 3-5. METHOD OF SETTING THE SERVICE ADJUSTMENT MODE

### (1) SERVICE MODE PROCEDURE

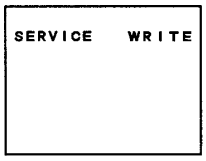
1. Standby mode. (Power off)
2. DISPLAY → 5 → VOL (+) → POWER on the Remote Commander. (Press each button within a second.)

### (2) SERVICE ADJUSTMENT MODE IN




3. The CRT displays the item being adjusted.
4. Press 1 or 4 on the Remote Commander to select the item.
5. Press 3 or 6 on the Remote Commander to change the data.
6. Press MUTING then ENTER to write into memory.

### (3) SERVICE ADJUSTMENT MODE MEMORY




MUTING Green
↓
ENTER Red

7. Turn set off and on to exit.

## 3-6. WHITE BALANCE ADJUSTMENTS

1. Input an entire white signal.
2. Set to Service adjustment Mode.
3. Set DCOL to "0"
4. Set the PICTURE and BRIGHT to minimum.
5. Adjust with SBRT if necessary.
6. Select GCUT and BCUT with 1 and 4 .
7. Adjust with 3 and 6 for the best white balance.
8. Set the PICTURE and BRIGHT to maximum.
9. Select GDRV and BDRV with 1 and 4 .
10. Adjust with 3 and 6 for the best white balance.
11. Reset DCOL to "1".
12. Write into the memory by pressing MUTING then ENTER .

# SECTION 4
# SAFETY RELATED ADJUSTMENTS

## A BOARD

### ⋈ R584 CONFIRMATION METHOD (HV HOLD-DOWN CONFIRMATION) AND READJUSTMENTS

The following adjustments should always be performed when replacing the following components which are marked with ◪ on the schematic diagram:

DY, C511,C572, C573, C574, C575, D573, D574, R582, R583 R585, R586, R578, R579, T504, IC301, IC521, IC603, C507, C508, C509, C515, C520, L591,L501

#### (1) Preparation before Confirmation

Using Variac, apply AC input voltage: 120±2VAC
(or 220 ± 2 VAC for KV-29SL40A/29SL40C 29SL65C/29XT11A ONLY)

1) Turn the POWER switch ON.
2) Input a white signal and set the PICTURE and BRIGHT controls to maximum.
3) Confirm that the voltage between C574 (+) or TP503 and ground is more than: 105VDC.

#### (2) Hold-down Operation Confirmation

1) Connect the current meter between Pin 11 of the FBT (T504) and the PCB land where Pin 11 would normally attach. (see figure 1.0 on next page)
2) Input a dot signal and set PICTURE and BRIGHTNESS to minimum: IABL = 100±100µA
3) Confirm the voltage of A board TP-600 is 135 ± 3VDC
4) Connect the Digital Voltmeter and the DC power supply via diode 1SS119 to C574 (+). (See figure 1.0 on next page.)
5) Increase the DC power voltage gradually until the picture blanks out.
6) Turn DC power source off immediately.
7) Read the digital voltmeter indication.

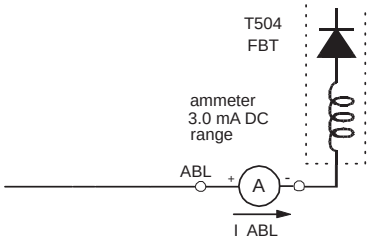
   STANDARD
   Less than or equal to: 141.3 VDC

8) Input a white signal and set PICTURE and BRIGHTNESS to maximum: IABL = 1750±100µA
9) Repeat steps from (4) to (7).

   STANDARD
   Less than or equal to: 141.3 VDC

#### (3) Hold-down Readjustment

If the current setting indicated in step 2-2 cannot be met, readjustment should be performed by altering the resistance value of R584, a component marked with ⋈.




### B+ VOLTAGE CONFIRMATION AND ADJUSTMENT

The following adjustments should always be performed when replacing the following components which are marked with ◪ on the schematic diagram:

IC603, IC601, R699

1) Using Variac, apply AC input voltage: 130 ± 2.0 VAC (or 220.0 ± 2.0 VAC for KV-29SL40A/29SL40C/ 29SL65C/29XT11A only).
2) Input a dot signal.
3) Set the PICTURE control and the BRIGHT control to minimum.
4) Set to service adjustment mode.
5) Select PADJ with [1] and [4] .
6) Adjust with [6] to the 0 level.
7) Confirm the voltage of A BOARD TP-600 is less than 138 VDC.
8) If step 7 is not satisfied, replace the components, repeat the above steps.
9) Adjust with [3] and [6] for: 135 ± 3 VDC
10) Write into the memory by pressing [MUTING] then [ENTER].

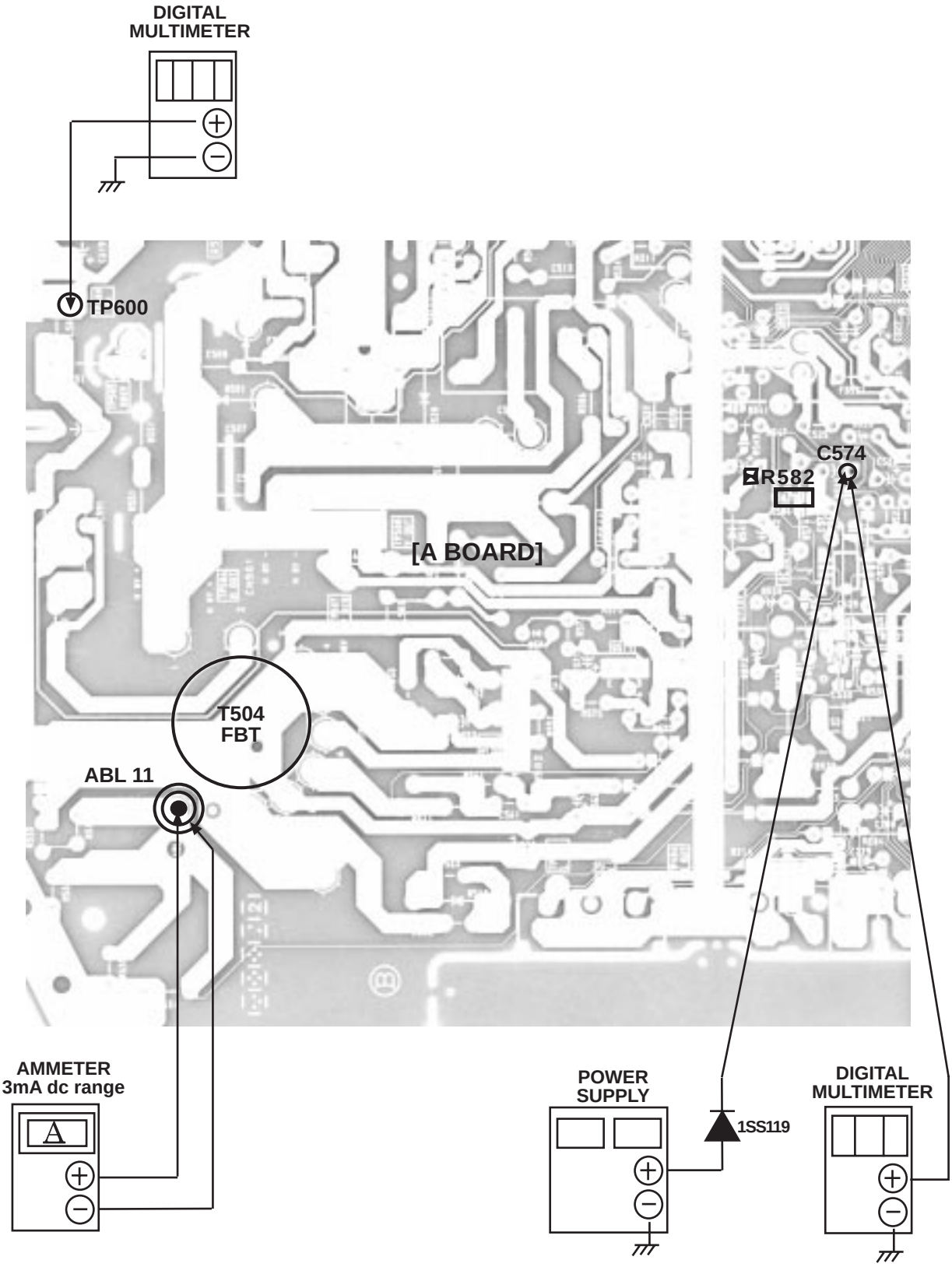

DIGITAL
MULTIMETER
TP600
[A BOARD]
C574
R582
T504
FBT
ABL 11
AMMETER
3mA dc range
A
POWER
SUPPLY
1SS119
DIGITAL
MULTIMETER

Figure 1.0

# SECTION 5
# CIRCUIT ADJUSTMENTS

## 5-1. ELECTRICAL ADJUSTMENT BY REMOTE COMMANDER

Use Remote Commander (RM-Y167) to perform circuit adjustments on this model.

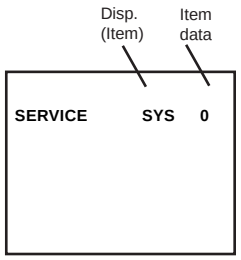
NOTE : Test Equipment Required:
1. Pattern Generator
2. Frequency Counter
3. Digital Multimeter
4. Audio OSC

### (1) Method of Setting the Service Adjustment Mode

SERVICE MODE PROCEDURE

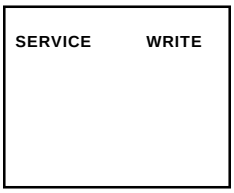
1. Standby mode. (Power off)
2. DISPLAY → 5 → VOL (+) → POWER on the Remote Commander. (Press each button within a second.)

SERVICE ADJUSTMENT MODE IN



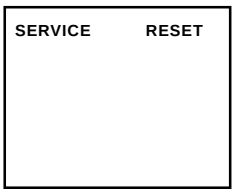

3. The CRT displays the item being adjusted.
4. Press 1 or 4 on the Remote Commander to select the item.
5. Press 3 or 6 on the Remote Commander to change the data.
6. Press MUTING then ENTER to write into memory.

SERVICE ADJUSTMENT MODE MEMORY




MUTING Green
↓
ENTER Red

7. Press 8 then ENTER on the Remote Commander to initialize.



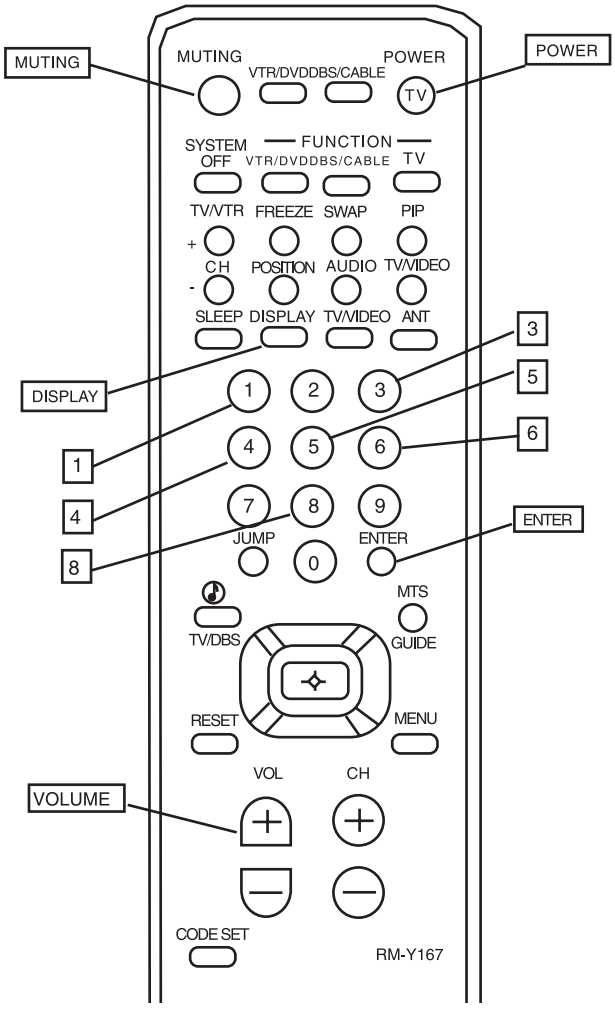

Carry out step 7 when adjusting IDs 0 to 4 and when replacing and adjusting IC003.

8. Turn set off and on to exit.

### (2) Memory Write Confirmation Method

1. After adjustment, pull out the plug from the AC outlet, then replace the plug in the AC outlet again.
2. Turn the power switch ON and set to service mode.
3. Call the adjusted items again to confirm they were adjusted.

### (3) Adjust Buttons and Indicator




RM-Y167

## (4) Item of Adjustments

| NO. | ITEM | FUNCTION | DATA RANGE | INITIAL DATA | | | | AVERAGE DATA |
|---|---|---|---|---|---|---|---|---|
| | | | | NTSC | PAL-M | PAL-N | VIDEO | |
| 1 | HSIZ | HORIZONTAL AMP. ADJ. | 0-63 | 45 | 45 | 45 | | 48 |
| 2 | HPOS | HORIZONTAL POS. ADJ. | 0-63 | 10 | 10 | 10 | | 10 |
| 3 | VBOW | VRT LINE BOWING ADJ. | 0-15 | | 6 | | | 6 |
| 4 | VANG | VRT LINE BOW SLANT ADJ. | 0-15 | | 5 | | | 5 |
| 5 | TRAP | HORIZ. TRAPEZOID ADJ. | 0-15 | | 7 | | | 5 |
| 6 | PAMP | HORIZ. PIN DISTORTION ADJ. | 0-63 | 20 | 20 | 20 | | 30 |
| 7 | CPIN | SAME AS PAMP-SCRN TP/BTM | 0-63 | 40 | 40 | 40 | | 30 |
| 8 | VSIZ | VERTICAL AMP. ADJUST | 0-63 | 31 | 31 | 38 | | 35 |
| 9 | VPOS | VERTICAL POSITION ADJ. | 0-63 | 35 | 35 | 35 | | 35 |
| 10 | VLIN | VERTICAL LINEARITYADJ. | 0-15 | 6 | 6 | 6 | | 6 |
| 11 | SCOR | VERTICAL AMOUNT ADJ. | 0-15 | 8 | 8 | 8 | | 8 |
| 12 | VZOM | 16:9 CRT Z MODE ON/OFF | 0,1 | | 0 | | | 0 |
| 13 | EHT | VRT Hl-VOLT. CORRECTION | 0-15 | | 4 | | | 4 |
| 14 | ASP | ASPECT RATIO CONTROL | 0-63 | | 47 | | | 47 |
| 15 | SCRL | 16:9 CRT Z MODE TRAN SCRL | 0-63 | | 31 | | | 31 |
| 16 | HBLK | RGB OUT WIDTH CONTROL | 0,1 | | 1 | | | 1 |
| 17 | LBLK | LEFT SCREEN HBLK CONTROL | 0-15 | | 15 | | | 15 |
| 18 | RBLK | RGT SCREEN HBLK CONTROL | 0-15 | | 3 | | | 3 |
| 19 | VUSN | V SAW WAVEFORM COMPRES | 0,1 | | 0 | | | 0 |
| 20 | HDW | H. DRIVE PULSE WIDTH | 0,1 | | 0 | | | 0 |
| 21 | EWDC | EW/DC ADJUST | 0,1 | | 0 | | | 0 |
| 22 | LVLN | SCREEN BTM VRT LIN ADJUST | 0-15 | | 0 | | | 0 |
| 23 | UVLN | SCREEN TOP VRT LIN ADJUST | 0-15 | | 0 | | | 0 |
| 24 | RDRV | R OUTPUT DRIVE CONTROL | 0-63 | | 35 | | | 40 |
| 25 | GDRV | G OUTPUT DRIVE CONTROL | 0-63 | | 30 | | | 35 |
| 26 | BDRV | B OUTPUT DRIVE CONTROL | 0-63 | | 30 | | | 35 |
| 27 | RCUT | R OUTPUT CUTOFF CONTROL | 0-15 | | 10 | | | 7 |
| 28 | GCUT | G OUTPUT CUTOFF CONTROL | 0-15 | | 7 | | | 5 |
| 29 | BCUT | B OUTPUT CUTOFF CONTROL | 0-15 | | 7 | | | 5 |
| 30 | DCOL | DYNAMIC COLOR ON/OFF | 0,1 | | 0 | | | 1 |
| 31 | SHUE | SUB HUE | 0-31 | | 14 | | | 8 |
| 32 | SCOL | SUB COLOR | 0-31 | 14 | 14 | 14 | | 14 |
| 33 | SBRT | SUB BRIGHTNESS | 0-31 | | 11 | | | 12 |
| 34 | RON | R OUTPUT ON/OFF | 0,1 | | 1 | | | 1 |
| 35 | GON | G OUTPUT ON/OFF | 0,1 | | 1 | | | 1 |
| 36 | BON | B OUTPUT ON/OFF | 0,1 | | 1 | | | 1 |
| 37 | AXPL | AXIS PAL | 0,1 | | 0 | | | 0 |
| 38 | AXNT | AXIS NTSC | 0,1 | | 0 | | | 0 |
| 39 | CBPF | CHROMA BPF ON/OFF | 0,1 | | 0*, 1** | | | |
| 40 | CTRP | Y TRAP FILTER ON/OFF | 0,1 | | 1*, 0** | | | |
| 41 | COFF | COLOR ON/OFF | 0,1 | | 0 | | | 0 |
| 42 | KOFF | SET COLOR KILLER | 0,1 | | 0 | | | 0 |
| 43 | SSHP | SUB SHARPNESS | 0-15 | | 7 | | | 7 |
| 44 | SHPF | SHARPNESS CIRCUIT F0 | 0,1 | | 1 | | 1 | 1 |
| 45 | PREL | PRE/OVR SHOOT SWITCHING | 0,1 | | 1 | | | 1 |
| 46 | Y-DC | DC TRANS RATIO SWITCHING | 0,1 | | 1 | | | 1 |
| 47 | GAMM | GAMMA CORRECTION AMNT | 0-3 | | 0 | | | 0 |
| 48 | ABLM | ABL MODE SWITCHING | 0,1 | | 1 | | | 1 |
| 49 | VTH | ABL C D VTH SWITCHING | 0,1 | | 1 | | | 1 |
| 50 | YDEL | Y DELAY TIME CONTROL | 0-15 | | 7 | | | 7 |
| 51 | NCOL | NO COLOR ID | 0,1 | | 1 | | | 1 |
| 52 | FSC | FSC OUT ON/OFF | 0,1 | | 1*, 0** | | | |
| 53 | K-ID | KILLER ID CONTROL SW | 0,1 | | 0 | | | 0 |
| 54 | HOSC | H VCO OSCILLATION FREQ | 0-15 | | 7 | | | 7 |
| 55 | VSS | V SYNC SLICE LEVEL | 0,1 | | 0 | | | 0 |
| 56 | HSS | H SYNC SLICE LEVEL | 0,1 | | 0 | | | 0 |
| 57 | HMSK | | 0,1 | | 1 | | | 1 |
| 58 | VTMS | SELECT SIGNAL VTIM PIN | 0-3 | | 0 | | | 0 |
| 59 | CDMD | V CNT DWN MODE SWITCHING | 0-3 | | 0 | | 1 | |
| 60 | AFC | AFC LOOP GAIN SWITCHING | 0-3 | | 0 | | 0 | |

| NO. | ITEM | FUNCTION | DATA RANGE | INITIAL DATA | | | | AVERAGE DATA |
|---|---|---|---|---|---|---|---|---|
| | | | | NTSC | PAL-M | PAL-N | VIDEO | |
| 61 | FIFR | FIELD FREQUENCY | 0-3 | 3*, 1** | | | | |
| 62 | SBAL | SUB BALANCE | 0-31 | 14 | | | | 14 |
| 63 | DISP | OSD POSITION | 0-127 | 15 | | | | 15 |
| 64 | PADJ | POWER ADJUSTMENT | 0-63 | 3 | | | | 3 |
| 65 | PSHP | PIP SUB SHARPNESS | 0-15 | 7 | | | | 7 |
| 66 | PPIX | PIP SUB CONTRAST | 0-15 | 7 | | | | 7 |
| 67 | PHUE | PIP SUB HUE | 0-15 | 3 | | | | 3 |
| 68 | PCOL | PIP SUB COLOR | 0-15 | 5 | 5 | 5 | | 5 |
| 69 | PTRP | PIP C TRAP F0 | 0-15 | 7 | | | | 7 |
| 70 | PAFC | PiP AFC | 0-3 | 1 | | | 1 | 1 |
| 71 | PYDR | PIP Y DRIVE | 0-31 | 14 | | | | 14 |
| 72 | UPED | U PED | 0-15 | 8 | | | | 8 |
| 73 | VPED | V PED | 0-15 | 8 | | | | 8 |
| 74 | U2PE | U2 PED | 0-15 | 5 | | | | 5 |
| 75 | V2PE | V2 PED | 0-15 | 5 | | | | 5 |
| 76 | Y2DR | Y2 DRIVE | 0-31 | 20 | | | | 20 |
| 77 | U2DR | U2 DRIVE | 0-31 | 18 | | | | 18 |
| 78 | V2DRV | V2 DRIVE | 0-31 | 9 | | | | 9 |
| 79 | PSFO | PIP SHP F0 | 0,1 | 1 | | | | 1 |
| 80 | PCD2 | PIP CD MODE 2 | 0,1 | 1 | | | 1 | 1 |
| 81 | PDCT | PIP DC TRAN | 0-7 | 4 | | | | 4 |
| 82 | PP/O | PIP PRE/OVER | 0-3 | 1 | | | | 1 |
| 83 | PDLY | PIP Y DELAY | 0-3 | 0 | | | | 0 |
| 84 | PBG | PIP BG | 0-15 | 5 | | | | 5 |
| 85 | PEXT | PIP EXT COLOR | 0,1 | 1*, 0** | | | | 1** 0* |
| 86 | PHMK | | 0,1 | 0 | | | | 0 |
| 87 | ABL0 | | 0,1 | 0 | | | | 0 |
| 88 | ABL1 | | 0-7 | 1 | | | | 1 |
| 89 | PHPO | PIP HORIZONTAL POSITION | 0-63 | 58 | | | | 58 |
| 90 | PVPO | PiP VERTICAL POSiTiON | 0-31 | 18 | | | | 18 |
| 91 | PYSD | PIP YS DELAY | 0-15 | 1 | | | | 1 |
| 92 | PYDL | PIP Y INPUT DELAY | 0-7 | 0 | | | | 0 |
| 93 | PHVI | PIP HV SYNC | 0,1 | 0 | | | | 0 |
| 94 | PCLP | PIP CLAMP | 0-3 | 0 | | | | 0 |
| 95 | PCLK | PIP CLOCK | 0,1 | 1 | | | | 1 |
| 96 | PIHS | INSET HORIZONTAL SYNC | 0-15 | 2 | | | | 2 |
| 97 | PIVS | INSET VERTICAL SYNC | 0-63 | 22 | | | | 22 |
| 98 | PMVS | MAIN VERTICAL SYNV | 0-63 | 17 | | | | 17 |
| 99 | PCON | PIP CONTRAST | 0-15 | 10 | | | | 10 |
| 100 | PFRY | PIP FRAME Y | 0-15 | 5 | | | | 5 |
| 101 | PFRC | PIP FRAME CHROMA | 0-255 | 0 | | | | 0 |
| 102 | PFRW | PIP FRAME WIDTH | 0-31 | 20 | | | | 20 |
| 103 | PSEL | PIP SEL | 0,1 | 1 | | | | 1 |
| 104 | PPLL | PIP PLL | 0-3 | 0 | | | | 0 |
| 105 | PVPE | PIP V PED | 0-15 | 0 | | | | 0 |
| 106 | PUPE | PIP U PED | 0-15 | 0 | | | | 0 |

* NTSC MODELS
** TRINORMA MODELS

SERVICE ID0 25

Note: No. 1 through 106 show adjustment order.

### (5) Feature ID Map

| | KV- | DESTINATION | ID-0 | ID-1 | ID-2 | ID-3 | ID-4 | ID-5 | ID-6 | ID-7 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **27S40** | (US) | 153 | 1 | 13 | 195 | 31 | 1 | 0 | 64 |
| 2 | **27S40** | (CND) | 129 | 1 | 13 | 195 | 31 | 1 | 0 | 64 |
| 3 | **27S45** | (US) | 153 | 27 | 13 | 195 | 31 | 1 | 1 | 64 |
| 4 | **27S45** | (CND) | 129 | 27 | 13 | 195 | 31 | 1 | 1 | 64 |
| 5 | **27S65** | (US) | 153 | 27 | 15 | 195 | 31 | 1 | 7 | 64 |
| 6 | **27S65** | (CND) | 129 | 27 | 15 | 195 | 31 | 1 | 7 | 64 |
| 7 | **29SL40** | (E) | 145 | 1 | 141 | 195 | 63 | 1 | 0 | 64 |
| 8 | **29SL40A** | (E) | 151 | 1 | 141 | 195 | 55 | 1 | 0 | 64 |
| 9 | **29SL40C** | (E) | 145 | 1 | 141 | 195 | 63 | 1 | 0 | 64 |
| 10 | **29SL45** | (E) | 145 | 27 | 141 | 195 | 63 | 1 | 1 | 64 |
| 11 | **29SL65** | (E) | 145 | 27 | 143 | 195 | 63 | 1 | 7 | 64 |
| 12 | **29SL65C** | (E) | 145 | 19 | 143 | 195 | 63 | 1 | 7 | 64 |
| 13 | **29XL40M** | (MX) | 145 | 1 | 141 | 195 | 63 | 1 | 0 | 64 |
| 14 | **29XL40P** | (E) | 145 | 1 | 141 | 195 | 63 | 1 | 0 | 64 |
| 15 | **29XT11A** | (E) | 151 | 1 | 141 | 195 | 55 | 1 | 0 | 64 |

## 5-2. A BOARD ADJUSTMENTS

### H. FREQUENCY ADJUSTMENT

1. Input a monoscope signal.
2. Set to Service adjustment Mode.
3. Connect a frequency counter to base of Q501 (TP-500 H. DRIVE).
4. Select the item of AFC, set to 3 level (free run).
5. Check H. Frequency for the 15735 ± 200 Hz. (NTSC) or check H. Frequency for the 15650 ± 200 Hz. (Trinorma)
6. Select the item of AFC again, adjust the level "0".
7. Write into the memory by pressing [MUTING] then [ENTER] .

### V. FREQUENCY ADJUSTMENT

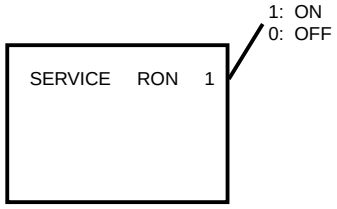
1. Select video 1 with no signal input.
2. Set the conditions with standard setting.
3. Connect the frequency counter across TP-508 or CN501 VDY (+) pin ⑥ connector and ground.
4. Check V. Frequency for the 60 ± 2 Hz (NTSC)
5. Check V. Frequency for the 50 ± 2 Hz (Trinorma).

### SUB CONTRACT ADJUSTMENT (SCON)

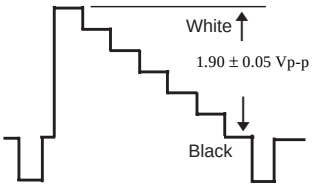
1. Input a color-bar signal.
2. Select the red color.
3. Set to Service adjustment Mode.
4. Select the item DCOL to "0" level.
5. Set the conditions as follows.

PICTURE . . . . . MAX
COLOR . . . . . MIN
BRIGHT . . . . . CENTER

R ON . . . . . ON (1)
G ON . . . . . OFF (0)
B ON . . . . . OFF (0)




6. Connect an oscilloscope probe to C Board, CN301 Pin ⑤ (RED OUT).
7. Select RDRV with [1] and [4] .
8. Adjust with [3] and [6] for: 1.90 ± 0.05 Vp-p.



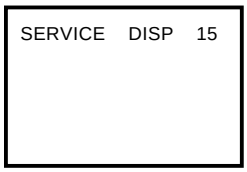

9. Reset the item DCOL to "1" level.
10. Write the memory by pressing [MUTING] then [ENTER] .
11. Return the following back to normal after adjustment.

PICTURE . . . . . MAX
COLOR . . . . . CENTER
BRIGHT . . . . . CENTER

R ON . . . . . ON (1)
G ON . . . . . ON (1)
B ON . . . . . ON (1)

## DISPLAY POSITION ADJUSTMENT (DISP)

1. Input a color-bar signal.
2. Set to Service adjustment Mode.
3. Select DISP with 1 and 4 .
4. Adjust with 3 and 6 for adjustment of characters to center .
5. Write the memory by pressing MUTING then ENTER .
6. Check if the text is displayed on the screen.

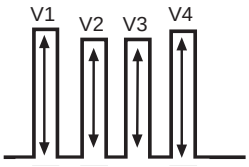



## SUB BRIGHT ADJUSTMENT (SBRT)

1. Input a cross-hatch signal.
2. Set to Service adjustment Mode.
3. Set the PICTURE and BRIGHT to minimum.
4. Select SBRT with 1 and 4 .
5. Adjust with 3 and 6 to obtain a faintly visible cross-hatch.
6. Write into the memory by pressing MUTING then ENTER.

## SUB HUE, SUB COLOR ADJUSTMENT (SHUE, SCOL)

1. Input a color-bar signal.
2. Set to Service adjustment Mode.
3. Select the item DCOL and set to "0" level.
4. Connect oscilloscope probe to C Board, CN301 Pin ⑦ (BLUE OUT).
5. Select SHUE and SCOL with 1 and 4 .
6. Adjust with 3 and 6 for the V1 = V4 ± 0.1Vp-p (SCOL) and V2 = V3 ± 0.1Vp-p (SHUE).

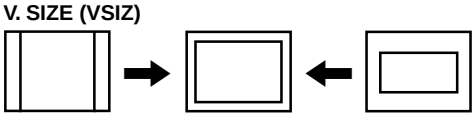



7. Reset the item DCOL to "1" level.
8. Write into the memory by pressing MUTING then ENTER .

## V. SIZE ADJUSTMENT ( VSIZ)

1. Input a cross-hatch signal.
2. Set to Service adjustment mode.
3. Select VSIZ with 1 and 4 .
4. Adjust with 3 and 6 for the best vertical size.

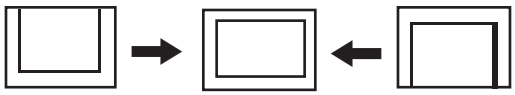
V. SIZE (VSIZ)



## V. CENTER ADJUSTMENT (VPOS)

1.Input a cross-hatch signal.
2.Set to Service adjustment Mode.
3.Select VPOS with 1 and 4 .
4.Adjust with 3 and 6 for the best vertical center.
5.Write into the memory by pressing MUTING then ENTER

V. CENTER (VPOS)

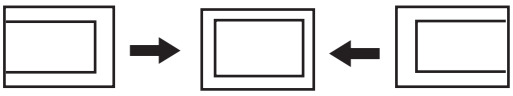


## H. CENTER ADJUSTMENT (HPOS)

Note : Perform this adjustment after checking H. FREQUENCY.

1. Input a cross-hatch signal.
2. Set the Service adjustment Mode.
3. Select HPOS with 1 and 4 .
4. Adjust with 3 and 6 for the best horizontal center.
5. Write into the memory by pressing MUTING then ENTER

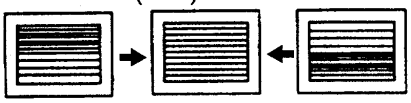
H. CENTER (VPOS)



## V. LINEARITY (VLIN) AND V CORRECTION

1. Input a cross-hatch signal.
2. V. Correction is automatically adjusted from the circuit and should satisfy the conditions below:

V LINEARITY (VLIN)

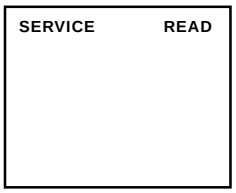


V CORRECTION

## SERVICE ADJUSTMENT MODE MEMORY

1. Change DCOL to "1".
2. After completing all adjustments, press "0" then ENTER .

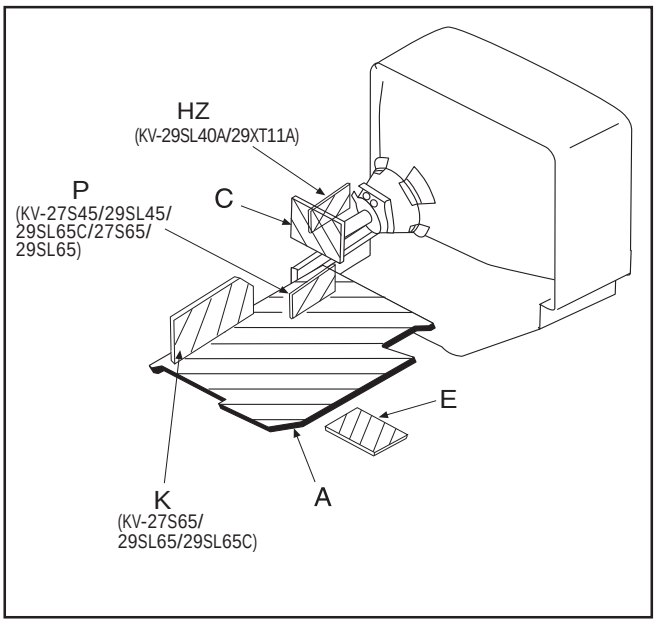
READ FROM MEMORY




Green
0

Red
ENTER

## 6-2. Circuit Boards Location




| Part replaced (◪) | Adjustment (⋈) |
|---|---|
| DY, C511, C572, C573, C574, C575, D573, D574, R582, R583, R585, R586, R578, R579, T504, IC301, IC521,IC603, C507, C508, C509, C515, C520, L591, L501 | HV HOLD-DOWN (R584) |

| | |
|---|---|
| IC603, IC601, R699 | B+ VOLTAGE CONFIRMATION |

## 6-3. Printed Wiring Boards and Schematic Diagrams

Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytic and tantalums.
- All electrolytics are 50V unless otherwise specified
- Indication of resistance, which does not have one for rating electrical power, is as follows:

| |
|---|
| Pitch: 5mm<br>Rating electrical power 1/4W |

- All resistors are in ohms.
  KΩ=1000Ω, MΩ=1000KΩ
- nonflammable resistor.
- Δ: internal component.
- : panel designation and adjustment for repair.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- The components identified by ◪ in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.
- When replacing components identified by ◪ make the necessary adjustments indicated. If results do not meet the specified value, change the component identified by ⋈ and repeat the adjustment until the specified value is achieved.
  (Refer to R584 on page 27 and 28).
- When replacing parts in the table below be sure to perform the related adjustment.

- All voltages are in V.
- Voltage is DC with respect to ground unless otherwise noted.
- Readings are taken with a 10MΩ digital multimeter.
- Readings are taken with a color-bar signal input.
- Voltage variations may be noted due to normal production tolerance.
- Circled numbers are waveform references.

- ▬▬ : B + Line
- - - - - : B - Line
- ⇨ : signal path

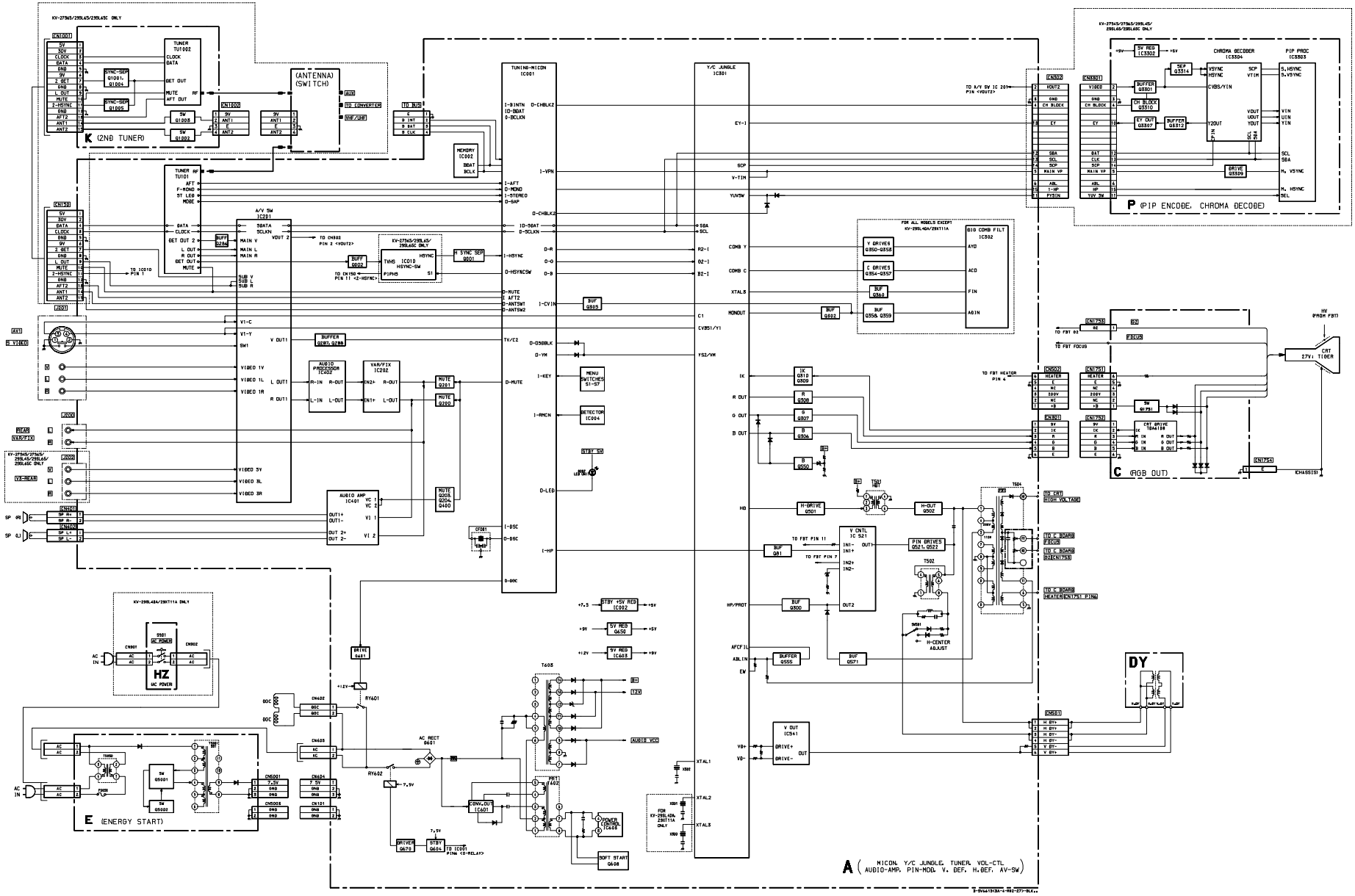
**Reference Information**

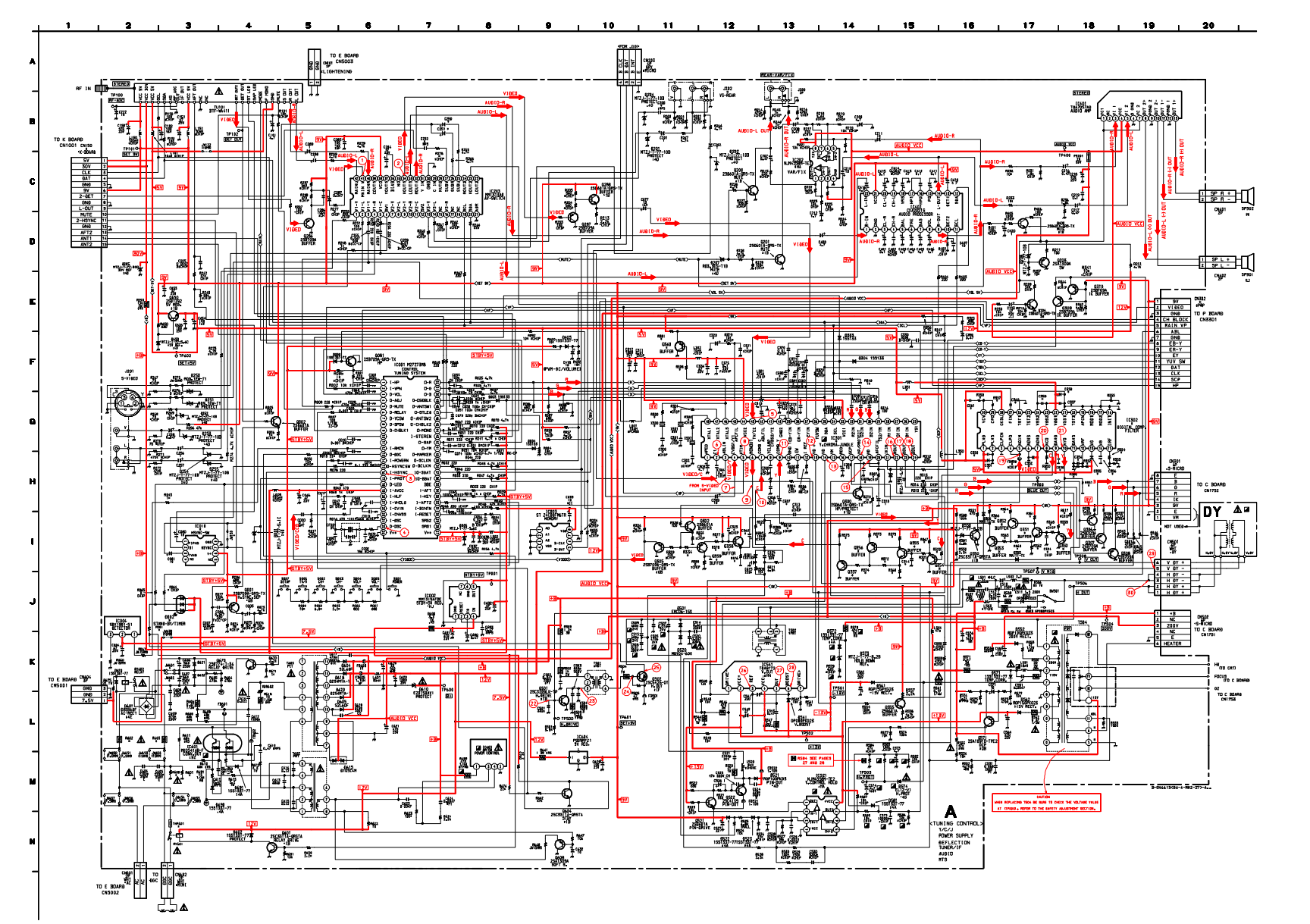
| | | | |
|---|---|---|---|
| RESISTOR | : | RN | METAL FILM |
| | : | RC | SOLID |
| | : | FPRD | NON FLAMMABLE CARBON |
| | : | FUSE | NON FLAMMABLE FUSIBLE |
| | : | RW | NON FLAMMABLE WIREWOUND |
| | : | RS | NON FLAMMABLE METAL OXIDE |
| | : | RB | NON FLAMMABLE CEMENT |
| | : | ※ | ADJUSTMENT RESISTOR |
| COIL | : | LF-8L | MICRO INDUCTOR |
| CAPACITOR | : | TA | TANTALUM |
| | : | PS | STYROL |
| | : | PP | POLYPROPYLENE |
| | : | PT | MYLAR |
| | : | MPS | METALIZED POLYESTER |
| | : | MPP | METALIZED POLYPROPYLENE |
| | : | ALB | BIPOLAR |
| | : | ALT | HIGH TEMPERATURE |
| | : | ALR | HIGH RIPPLE |

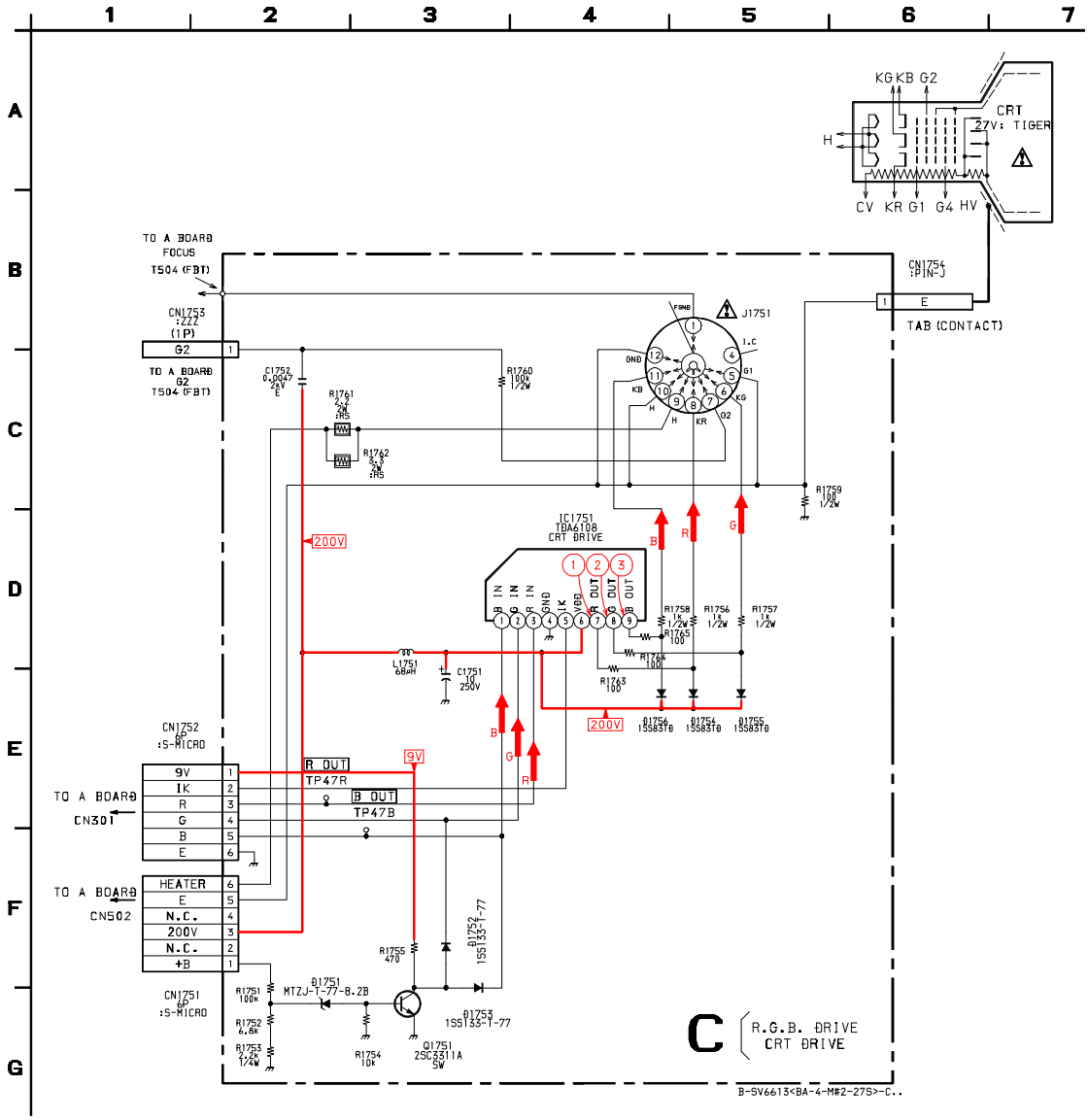
**Note: The symbol ⊣⊢ display is on the component side.**

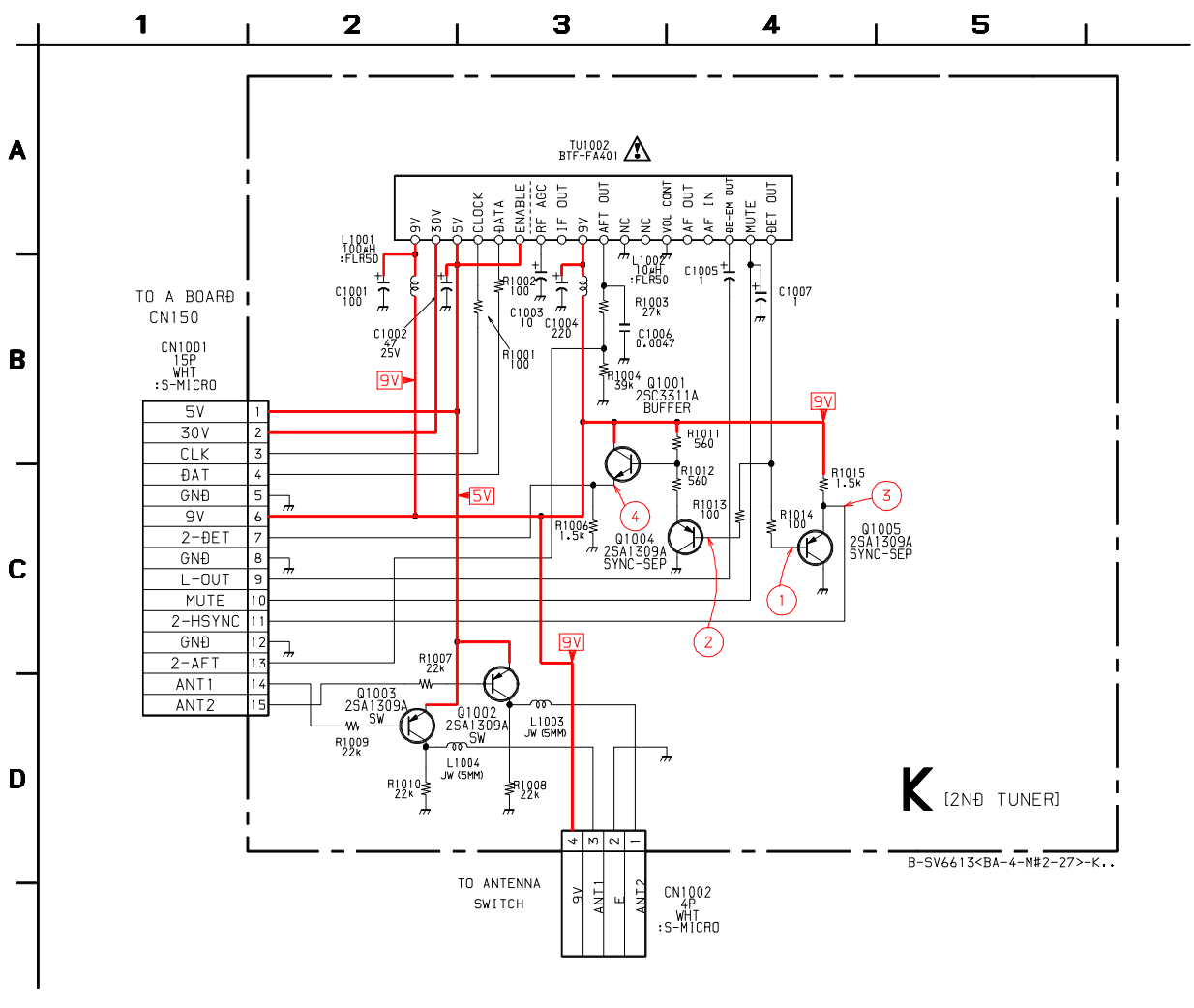
**The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.**

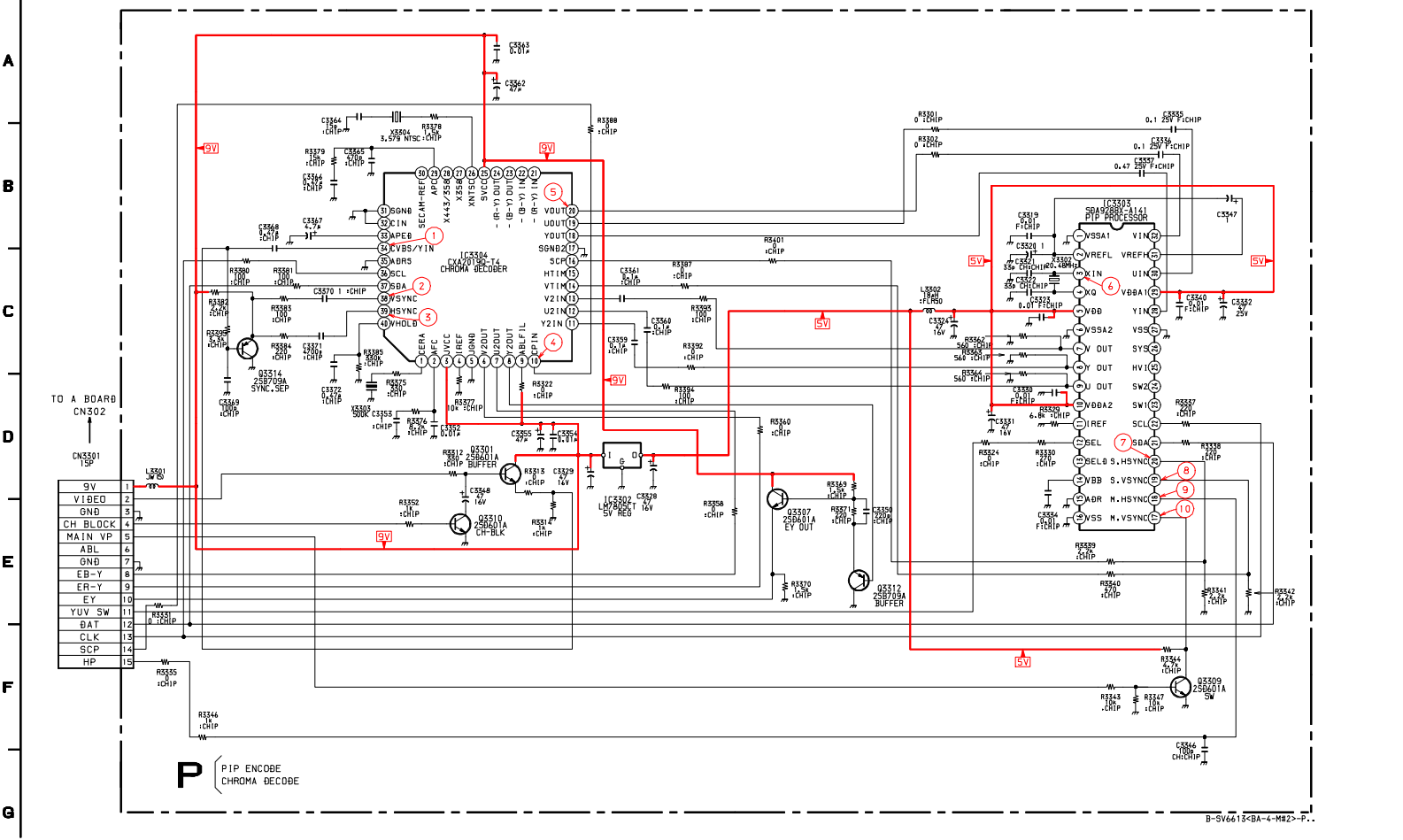
**The symbol ⊣⊢ indicates fast operating fuse. Replace only with fuse of same rating as marked.**

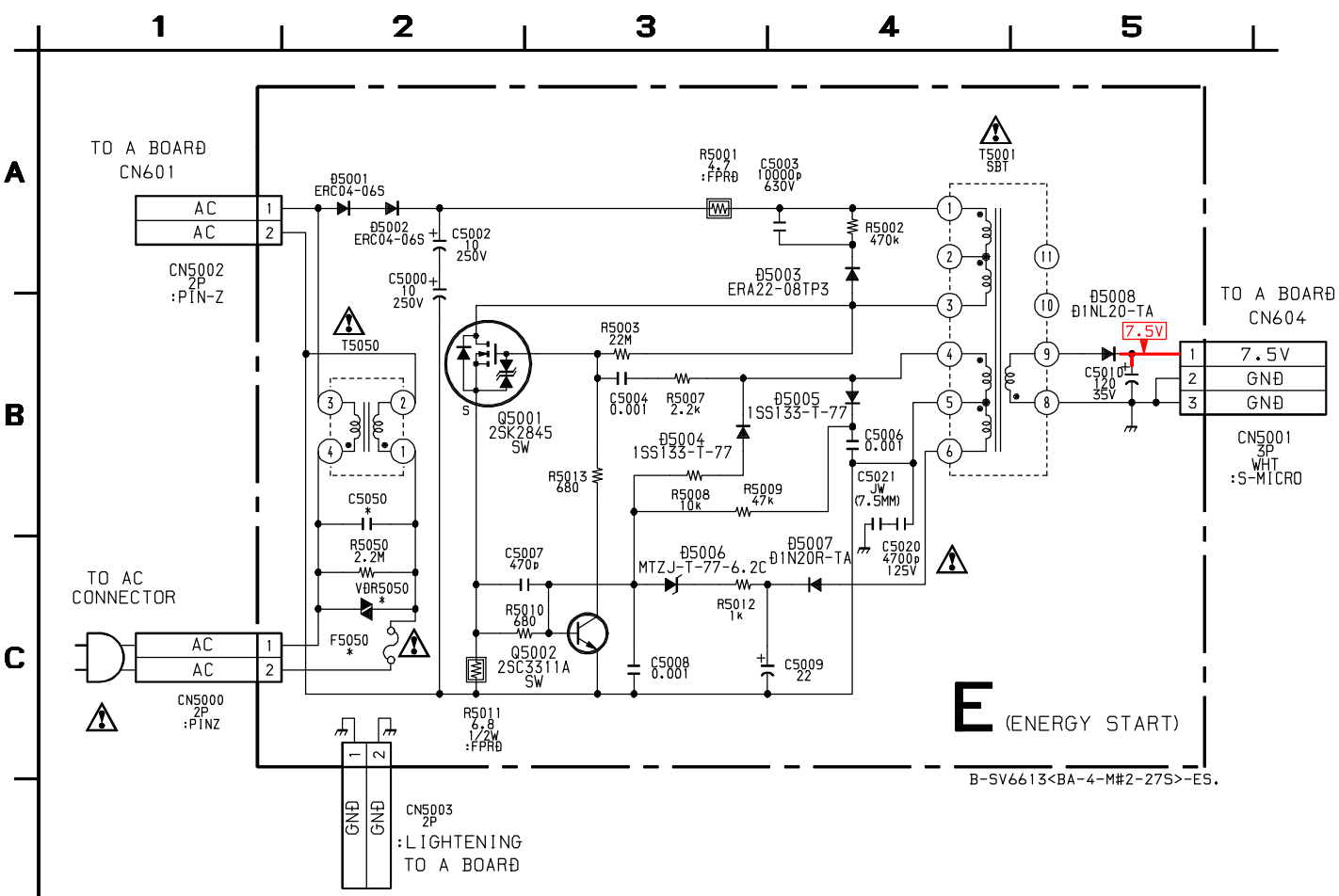

K (2ND TUNER)
P (PIP ENCODE, CHROMA DECODE)
C (RGB OUT)
E (ENERGY START)
A (MICON, Y/C JUNGLE, TUNER, VOL-CTL, AUDIO-AMP, PIN-MOD, V. DEF, H.DEF, AV-SW)
DY
HZ
TUNER TU1002
(ANTENNA) (SWITCH)
TUNER RF TU101
TUNING-MICON IC001
Y/C JUNGLE IC301
A/V SW IC201
AUDIO AMP IC401
VAR/FIX IC202
V CNTL IC 521
PIN DRIVES Q521,Q522
H-DRIVE Q501
H-OUT Q502
V OUT IC541
CHROMA DECODER IC5804
PIP PROC IC5803
5V REG IC5302
STBY +5V REG IC002
5V REG IC603
CRT 27V: T10ER
H-CENTER ADJUST

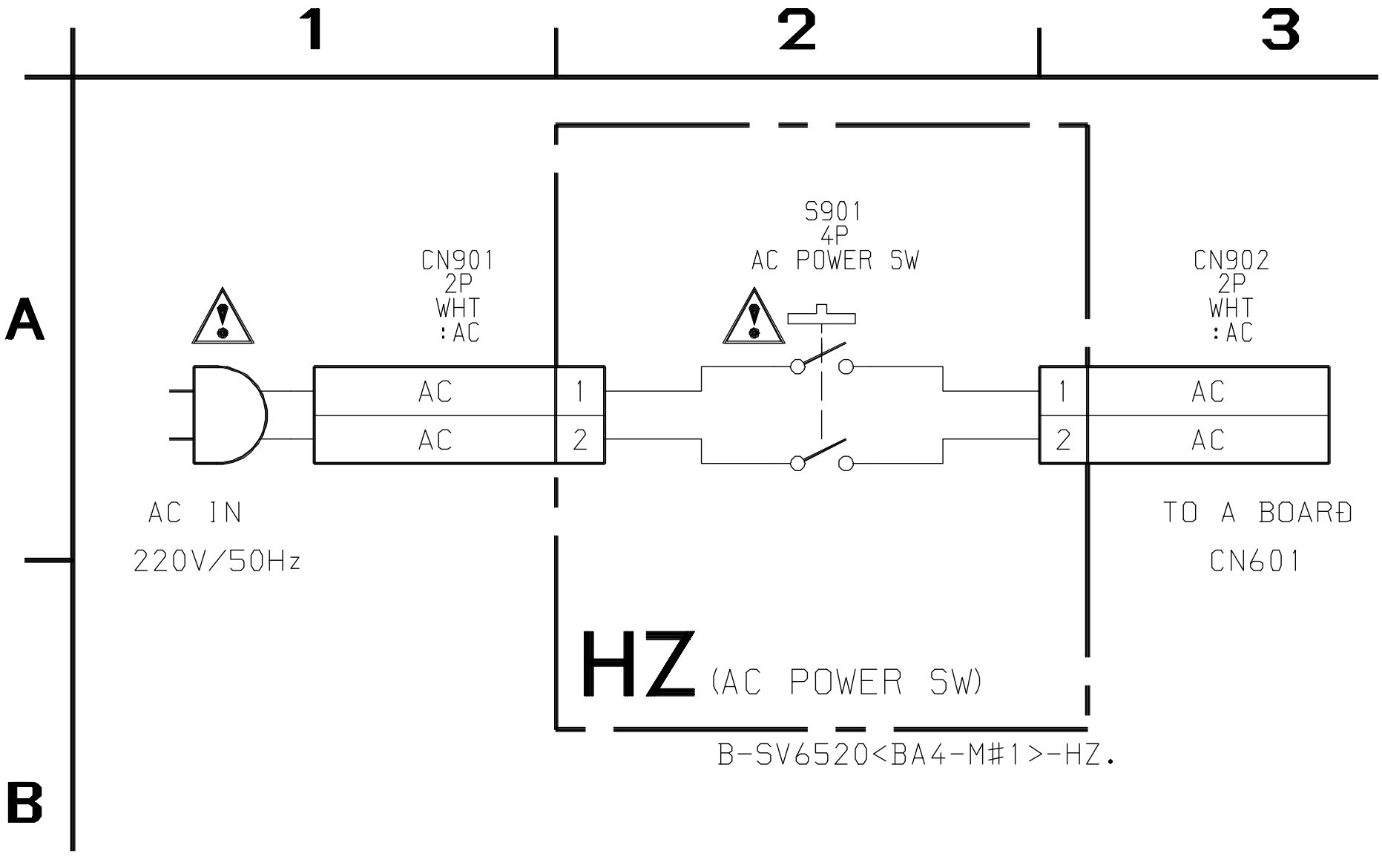

A
<TUNING CONTROL>
Y/C/J
POWER SUPPLY
DEFLECTION
TUNER/IF
AUDIO
RTS
DY
TO K BOARD CN1001 CN150 <K-BOARD>
TO C BOARD CN5001 <LIGHTENING>
TO C BOARD CN5001
TO E BOARD CN3002
TO P BOARD CN5801
TO C BOARD CN1752
TO C BOARD CN1751
TO C BOARD CN1755
TO CRT
FOCUS
HEATER
RF IN
VIDEO
AUDIO-R
AUDIO-L
AUDIO VCC
CAUTION
MADE REPLACING TAKE NO SURE TO CHECK THE VOLTAGE VALUE AT TYPE2H. REFER TO THE SAFETY ADJUSTMENT SECTION.


1
2
3
4
5
6
7
A
B
C
D
E
F
G
KG KB G2
CRT
27V: TIGER
H
CV KR G1 G4 HV
TO A BOARD
FOCUS
T504 (FBT)
CN1753
:ZZZ
(1P)
G2
TO A BOARD
G2
T504 (FBT)
C1752
0.0047
2kV
E
R1761
2.2
2W
:RS
R1762
2.2
2W
:RS
R1760
100k
1/2W
J1751
FGND
GND
KB
H
KR
G2
G1
K
I.C
CN1754
:PIN-J
E
TAB (CONTACT)
R1759
100
1/2W
IC1751
TBA6108
CRT DRIVE
B IN
G IN
R IN
GND
VDD
R OUT
G OUT
B OUT
200V
R1758
1/2W
R1756
1/2W
R1757
1/2W
R1765
100
R1764
100
R1763
100
L1751
68uH
C1751
10
250V
D1754
1SS83TB
D1754
1SS83TB
D1755
1SS83TB
CN1752
:S-MICRO
9V
IK
R
G
B
E
TO A BOARD
CN301
R OUT
TP47R
B OUT
TP47B
9V
HEATER
E
N.C.
200V
N.C.
+B
TO A BOARD
CN502
CN1751
:S-MICRO
R1755
470
D1752
1SS133-T-77
D1751
MTZJ-T-77-8.2B
R1751
100k
R1752
6.8k
R1753
2.2k
1/4W
R1754
10k
Q1751
2SC3311A
5W
D1753
1SS133-T-77
C
R.G.B. DRIVE
CRT DRIVE
B-SV6613<BA-4-M#2-27S>-C..


1
2
3
4
5
A
B
C
D
TU1002
BTF-FA401
9V
30V
5V
CLOCK
DATA
ENABLE
RF AGC
IF OUT
9V
AFT OUT
NC
NC
VOL CONT
AF OUT
AF IN
BE-EM OUT
MUTE
DET OUT
L1001
100μH
:FLR50
L1002
10μH
:FLR50
C1001
100
C1002
47
25V
C1003
10
C1004
220
C1005
1
C1006
0.0047
C1007
1
R1001
100
R1002
100
R1003
27k
R1004
39k
Q1001
2SC3311A
BUFFER
R1011
560
R1012
560
R1013
100
R1014
100
R1015
1.5k
R1006
1.5k
Q1004
2SA1309A
SYNC-SEP
Q1005
2SA1309A
SYNC-SEP
TO A BOARD
CN150
CN1001
15P
WHT
:S-MICRO
5V 1
30V 2
CLK 3
DAT 4
GND 5
9V 6
2-DET 7
GND 8
L-OUT 9
MUTE 10
2-HSYNC 11
GND 12
2-AFT 13
ANT1 14
ANT2 15
R1007
22k
Q1003
2SA1309A
SW
Q1002
2SA1309A
SW
L1003
JW (5MM)
R1009
22k
L1004
JW (5MM)
R1010
22k
R1008
22k
TO ANTENNA
SWITCH
4 9V
3 ANT1
2 E
1 ANT2
CN1002
4P
WHT
:S-MICRO
K [2ND TUNER]
B-SV6613<BA-4-M#2-27>-K..


TO A BOARD
CN302
CN3301
15P
9V
VIDEO
GND
CH BLOCK
MAIN VP
ABL
GND
EB-Y
ER-Y
EY
YUV SW
DAT
CLK
SCP
HP
IC3304
CXA2018Q-T4
CHROMA DECODER
IC3303
SDA9288-A141
PIP PROCESSOR
IC3502
LM78L05CT
5V REG
Q3301
2SB601A
BUFFER
Q3310
2SB601A
CH-BLK
Q3307
2SB601A
EY OUT
Q3312
2SB709A
BUFFER
Q3314
2SB709A
SYNC.SEP
Q3309
2SB601A
SW
P
PIP ENCODE
CHROMA DECODE
B-SV6613<BA-4-M82>-P..


1
2
3
4
5
A
B
C
TO A BOARĐ
CN601
AC
AC
CN5002
2P
:PIN-Z
Đ5001
ERC04-06S
Đ5002
ERC04-06S
C5002
10
250V
C5000
10
250V
R5001
4.7
:FPRĐ
C5003
10000p
630V
R5002
470k
Đ5003
ERA22-08TP3
T5001
SBT
Đ5008
ĐINL20-TA
7.5V
C5010
120
35V
TO A BOARĐ
CN604
7.5V
GNĐ
GNĐ
CN5001
3P
WHT
:S-MICRO
T5050
R5003
22M
C5004
0.001
R5007
2.2k
Đ5005
1SS133-T-77
Đ5004
1SS133-T-77
R5013
680
R5008
10k
R5009
47k
C5006
0.001
C5021
JW
(7.5MM)
C5020
4700p
125V
Q5001
2SK2845
SW
S
C5050
*
R5050
2.2M
VĐR5050
*
F5050
*
TO AC
CONNECTOR
AC
AC
CN5000
2P
:PINZ
C5007
470p
R5010
680
Q5002
2SC3311A
SW
Đ5006
MTZJ-T-77-6.2C
Đ5007
ĐIN20R-TA
R5012
1k
C5008
0.001
C5009
22
R5011
6.8
1/2W
:FPRĐ
GNĐ
GNĐ
CN5003
2P
:LIGHTENING
TO A BOARĐ
E
(ENERGY START)
B-SV6613<BA-4-M#2-27S>-ES.


1
2
3
A
B
CN901
2P
WHT
:AC
S901
4P
AC POWER SW
CN902
2P
WHT
:AC
AC
AC
1
2
1
2
AC
AC
AC IN
220V/50Hz
TO A BOARD
CN601
HZ (AC POWER SW)
B-SV6520<BA4-M#1>-HZ.